

**Remarks:**

The following remarks are numbered to correspond to the points of Examiner's office action.

1. (no remarks)
2. Regarding the drawings: Replacement sheets are submitted herewith, in which (a) the directions of the arrows joining element 105 to elements 110 and 120 are reversed in FIG. 1, and (b) in which FIGs 3-5 and 7 are labeled "Prior Art."
3. Regarding the Abstract: With this paper, the Abstract is amended to comply with the 150-word limitation.
4. Claim rejections under 35 USC 101: Applicant assumes that these rejections apply to claims 7-9 (and that the reference to claim 1 in the body of this point is a typographical error), and has amended these claims accordingly to clarify that the invention includes a computer program product comprising a computer usable medium that tangibly embodies computer usable program code.
5. (no remarks)
6. Claim rejections under 35 USC 102: Applicant's independent claims 1 and 7 stand rejected under 35 USC 102(b) as being anticipated by Govindarajan. Applicant respectfully holds that these rejections are not proper, for at least the following reasons.

Govindarajan teaches a three-phase approach (the lineage fusion phase, the lineage graph coloring phase, and the lineage scheduling phase), whereas Applicant teaches a one-phase approach (the instruction scheduling phase with rescheduling) to control the maximum number of registers. Claims 1 and 7 are amended to more clearly point out this distinction, by adding the phrase "in a single phase." This difference is a function of the order-determination reprocessing

unit (Figure 1, element 140), which appears in the last element of both claims 1 and 7. Please note that Govindarajan does not perform any rescheduling during the lineage scheduling phase.

In the technique of Govindarajan, the lineage scheduling phase sometimes requires more registers than is estimated in the lineage graph coloring phase (see Section 3.5, third paragraph, which notes that "Unfortunately, the above sequencing algorithm could result in a deadlock due to two reasons."). Govindarajan attempts to solve this problem by the lineage fusion phase, which is performed before the lineage coloring phase (see the last paragraph of Section 3.4). When the lineage fusion phase is not helpful, the lineage scheduling phase simply increases the maximum number of registers available rather than reducing the maximum number of registers required (Section 3.5, last paragraph).

Applicant's technique differs importantly. When the maximum number of registers required exceeds the number of registers available, Applicant's technique rolls-back part of the already scheduled instructions -- this is an important function of Applicant's order-determination reprocessing unit -- and reschedules them for later.

Because of these differences, Applicant's technique provides the following advantages over Govindarajan's: (1) rescheduling can handle the case wherein lineage fusion is not helpful by trying to reduce the number of required registers or by improving the scheduling of other dependent instructions, and (2) computational cost can be deferred to reduce the maximum number of registers required until actually needed (in contrast, Govindarajan always incurs this cost during the lineage fusion and lineage graph coloring phases). Thus, more generally, Applicant's technique is more powerful and efficient than Govindarajan's.

For at least these reasons, Applicant respectfully holds that independent claims 1 and 7 as amended here are patentable over Govindarajan, and so therefore are independent claims 2-6, 8, and 9.

**Summary:** With this paper, Applicant corrects the drawings and amends the Abstract as required by Examiner. Claim 7 is amended to overcome rejection under 35 USC 101. Claims 10

and 11 are canceled. Remaining now are independent claims 1 and 7 as amended here, along with their respective dependent claims. Further considering at least the reasons given above regarding claims 1 and 7 with respect to 35 USC 102(b), applicant respectfully holds that claims 1-9 are now ready for allowance, and respectfully asks Examiner to allow these claims and pass the application to issue.

Respectfully submitted,

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